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A MINERALOGICAL EXAMINATION OF A CALCITE SAMPLE FROM CHROMASCO, HALEY, ONTARIO

by

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A MINERALOGICAL EXAMINATION OF A CALCITE SAMPLE FROM CHROMASCO, HALEY, ONTARIO

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ABSTRACT

A sample of calcite from Chromasco was examined for the mode of occurrence of manganese. No discrete manganese minerals were observed but manganese was found to be in solid solution in the calcite. Microprobe analyses of the calcite gave an average of 0.08% MnO, 0.08% FeO and 0.05% MgO.

INTRODUCTION

Very pure calcite is used at Chromasco as raw material in the production of calcium metal (see Table 1).

Table 1. Partial Analyses of Three Calcite Samples from Chromasco* (Wt %)

	#1	#2	#3
LOI	43.52	43.61	43.51
SiO_2	0.42	0.50	0.44
MnO	0.21	0.19	0.21
MgO	0.16	0.15	0.12

*Data supplied by Chromasco

Removal of manganese, a significant impurity, by physical benefication is preferred to the less economical chemical dissolution.

A 1 kg sample of calcite, presumably of similar composition to that given in Table 1, was received from Mr. Alan Froats, Chief Metallurgist at Chromasco. Mr. Froats asked that the mode of occurrence of the manganese be determined to indicate whether its removal by a physical separation process is feasible.

RESULTS

The hand specimen was obviously very pure calcite but it also had very fine veins of a rusty coloured stain which indicated the possible presence of iron. Due to low levels of manganese it was decided to make four polished sections and two polished thin sections cut at intervals in the sample to increase the likelihood of exposing any discrete Mn-bearing minerals. The sections were examined by the optical microscope and the scanning electron microscope. The minerals identified were calcite, dolomite, quartz, mica (K,Al,Si) and an iron silicate (Fe,Ca,Si). All the minerals but calcite were present in trace amounts. The vein material consisted of variable proportions of quartz, mica, dolomite and iron silicate. The weathering of the iron silicate to produce an iron oxide is

presumably causing the rust-colored staining. No discrete Mn-bearing minerals were found.

Thirty-two electron microprobe analyses were performed on the calcite in all four polished sections for Mg, Mn and Fe. The calcite was found to be highly uniform in composition and the average results for the analyses are 0.08% MnO, 0.08% FeO and 0.05% MgO. No other elements were observed in the calcite X-ray spectra.

Wet chemical analysis by atomic absorption gave 0.08% MnO, 0.14% FeO and 0.05% MgO. This confirms the probe results that the Mn in this sample is present in less than half the amount expected. As a check, the gangue minerals-quartz, mica, dolomite and Fe-silicate - were examined qualitatively for the presence of manganese but the results showed insignificant levels of the element. The discrepancy between these results and the data in Table 1 may be due to assay error between labs and/or sampling error.

It may be concluded that, assuming the sample is representative, the manganese is present in solid solution in the calcite and therefore cannot be removed by physical means. Even if there were discrete Mn minerals present it is very doubtful that at these low levels gravity or flotation would be efficient.